DOCUMENT RESUME

ED 222 347 SE 039 396

AUTHOR	Caldwell, William; And Others
TITLE	The Big E (Energy). 4-H Leader's Guide [for Unit 1].
INSTITUTION	Nebraska Univ., Lincoln. Cooperative Extension Service.; Nebraska Univ., Lincoln. Inst. of Agriculture and Natural Resources.
SPONS AGENCY	Nebraska State Energy Office, Lincoln.
REPORT NO	EC-13-18-79
PUB DATE	79
NOTE	30p.; For related documents, see SE 039 397-400.
AVAILABLE FROM	Cooperative Extension Service, University of Nebraska, Ag. Hall, Rm. 116, Lincoln, NE 68583 ($.36 plus postage).
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	Climate Control; *Conservation Education; Educational Games; Elementary Education; *Energy; *Energy Conservation; Environmental Education; *Fuels; Heating; Leaders Guides; *Learning Activities; Lighting; Utilities
IDENTIFIERS	*4 H Clubs; *Energy Education; Nebraska

ABSTRACT

This guide is designed for leaders of the Nebraska 4-H Energy Project. The goals of the project are to: (1) help young people understand energy problems related to life styles; (2) use energy resources carefully; (3) guide members in choosing their own energy alternatives; and (4) enjoy together the challenges and creativity of finding energy solutions. Included in the guide are general strategies and information about the project and strategies for unit 1 (aimed at 9-11-year-old members). General strategies/information include hints for successful club meetings (work meetings, demonstrations, field trips, exhibits/fairs, and comments on evaluations and judging); characteristics of and general strategies for club members (9-11 year olds: grades 4-6 and 12-14 year-olds: grades 7-9); and lists of energy-related careers and publications to read for discussion, debate, demonstrations, and self-development. Provided specifically for unit 1 are objectives, background information, and instructional strategies for activities in the unit 1 member's booklet. These activities focus on fossil fuels, making an inventory of energy resources, draft detecting/fixing, energy for lighting, natural gas, testing for air leaks, and preparing and playing an energy game similar to frisbee. Strategies for preparing members for material in units 2 and 3 are also provided. (Author/JN)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

the big energy

Leader's Guide

EC 13-18-79

ED222347

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

✓ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

Gary A. Lay

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

SE 034 396

Institute of Agriculture and Natural Resources

EXTENSION WORK IN "AGRICULTURE, HOME ECONOMICS AND SUBJ... THERETO," THE COOPERATIVE EXTENSION SERVICE, INSTITUTE OF AGRICULTURE ... RESOURCES, UNIVERSITY OF NEBRASKA-LINCOLN, COOPERATING WITH THE COUNTIES AND ... DEPARTMENT OF AGRICULTURE
LEO E. LUCAS, DIRECTOR

Dear 4-H Leader:

The definition of an e Project Leader, according to the Word Game in the members Unit I Book, is "a very special person who helps members learn about family energy needs". That's just the beginning.

Who happens to have an extra pencil or a room thermometer at meetings when someone says "I forgot"? Who works hard to learn updated energy information, then turns others' confusion into confidence and competence? The same person who radiates when members show their finished work and the verdict is "well done"!

May you build happy memories of the e Project and guide members toward energy awareness and good e-use habits in daily living.

CREDITS

The Big e was prepared for you by:

William Caldwell, Assistant Director, 4-H Youth Development*
Donald Edwards, Director, University of Nebraska-Lincoln Energy Research and Development Center
Richard Goodding III, 4-H Youth Engineering Specialist, CES*
Kimberley A. Hart, Residential Energy Specialist, NEO**
Ardis Hutchins, Home Environment Specialist, CES*
Glen Krohn, Project Director & 4-H Youth Specialist, CES*
Gary Lay, Education Coordinator, NEO**
Mardel Meinke, Home Energy Coordinator, NEO**
Madeleine Panarelli, 4-H Energy Project Writer
Eloise G. Wilson, Artist, Ag Communications, CES*

* Cooperative Extension Service
** Nebraska Energy Office

This material was developed under contract with the Nebraska Energy Office with federal funds disbursed under Public Law 94-163 and 94-385.

Copyright 1979, Department of Agricultural Communications, Institute of Agriculture & Natural Resources, University of Nebraska-Lincoln.

Table of Contents

	Page
UNDERSTANDING THE e-PROJECT	5
LEADER'S PLANNING PAGES	6-9
1ST MEETING	10-11
2ND MEETING	11
ADDITIONAL MEETINGS:	
FOSSIL FUEL USE	12
HOME ENERGY CHECK	13
DRAFT DETECTING	13
"SAVE FOSSIL FUELS" ANSWERS	14-15
ELECTRICITY FOR LIGHTING	15
GAS MEETINGS	16
FOSSIE THE DRAFT-DETECTOR	17
BONUS ACTIVITY	18
FINAL MEETINGS	20
ANSWER TO WORD GAME	20
USE OF MANUALS II AND III	20
HINTS FOR SUCCESSFUL CLUB MEETINGS	22-24
UNDERSTANDING 4-H MEMBERS	25
ENERGY-RELATED CAREERS	26
PUBLICATIONS TO READ	27
SEND QUESTIONS	29
GROUPS THAT HAVE HELPED	29
SOURCES FROM NEO	30

Understanding the e-Project

Guiding young people in a statewide energy project to make intelligent choices about energy, and to develop skills and confidence, can become a satisfying experience for you.

GOALS FOR THE e-PROJECT ARE:

- to help young people to understand energy problems relating to lifestyles
- to use energy resources carefully
- to guide members in choosing their own energy alternatives
- to enjoy together the challenges and creativity of finding energy solutions

1. The Energy Project contains three Members' Books:
   UNIT I (ages 9-11) UNIT II (12-14) UNIT III (15-19)

   All participants should work to build skills with Units I & II before attempting Unit III, which is advanced and involves construction and engineering. Each Unit may be carried for 3 years.

2. Members will study energy resources, take inventories, measure household and transportation energy efficiency, construct energy related devices. They should be encouraged to seek outside activities and other 4-H projects* that are suggested throughout the Units. In this way, they will build upon an energy-emphasized program in 4-H. Many 4-H projects are interrelated with energy in the Engineering, Livestock and Home Economics on-going programs.

3. You may wish to divide activities up among members so that each will be done, reported, and shared. Young readers may need your help with Unit I.

4. Follow-through, positive responses, success with goals, and enjoyable activities should encourage members to continue in projects. Planning by members and by you can be supplemented with additional activities and audio-visuals that are included on the *Leader's Planning Pages* that follow.

*Many 4-H projects are listed in "4-H & Young Adult Literature" at your county Extension office.

Leader's Planning Pages – Unit I (for beginning members)

NOTE: For an 8-meeting project, select from the suggestions within each line-enclosed space.

MEETING CALENDAR DATE	*LEADER'S GUIDE PAGE NO.*	*RELATES TO MEMBER'S UNIT I PAGE NO.*	*PURPOSE OF ACTIVITY*
_____ (1st meeting with parents)	2-11	2-5	e-Project overview and planning; parental support; assign activities
_____	14	6-7	to learn e-words
_____	11	8	to know energy forms
_____ (2nd meeting ideas)	11	9	to know fossil fuel problems
_____	11-12	10	history of fossil fuel use
_____	11-12	11	present fossil fuel use
_____	13	12	to understand renewable and non-renewable fuels
_____	12-13	13	to introduce a living "fossil" and home energy checks
_____	13	14	how home heating and cooling affects energy use
_____	13	15	how to detect drafts
_____	13-14	16-19	how to fix drafts

NOTE: Audio-visuals relating to energy are available from the Nebraska Energy Office and through "Catalog of Slides, Filmstrips, Movies" and from Energy Project slides available from your county Extension office.

For a 3-year program of meetings, select from the 24 activities provided, as well as from follow-up activities suggested.

TYPE OF ACTIVITY	*SUGGESTIONS FOR FOLLOW-UP ACTIVITIES*
Members show letter to parents; invite them to 1st meeting	parents' and members' ideas:
word game	use words in energy story or talk
reading, simple counting; discuss what members already know about energy	read energy books from library; library field trip
audio-visuals; how to give a demonstration	members bring items made from fossil fuels; report on how derived from coal, etc.
story about life without fossil fuels (written or spoken)	report on how grandparents used fuels; audio-visuals on historic use of fossil fuels
demonstration of how money is budgeted wisely vs. spent; related to fossil fuel use	discussion; tie in with 4-H Money Project
list types and availability; puzzle and mirror tricks	list e-saving ideas for autos; introduce Bicycle Safety or Automotive Projects
shell maze game	adopt nautilus (seashell animals) as club mascot
house inspection (double checklist); parental supervision advised	audio-visuals; demonstrations of how to inspect houses for energy waste
make a simple draft-detector	field trip to hardware store or lumber yard for draft-fixing supplies
demonstration of types of draft-fixing materials	audio-visuals

MEETING CALENDAR DATE	*LEADER'S GUIDE PAGE NO.*	*RELATES TO MEMBER'S UNIT I PAGE NO.*	*PURPOSE OF ACTIVITY*
_____	14	20-21	second house check; to take house's temperature
_____	14	22	to emphasize fossil fuels
_____	15	22	focus on lighting
_____	15-16	23-24	good habits with lighting; to switch off unused lights
_____	16	25	to use natural or LP gas wisely
_____	16	26-30	gas use in the kitchen; compare energy used in corn products
_____	16	31	to study popcorn's energy chain and our energy dependence
_____	17	32	to understand one's own family's lifestyle
_____	17	33-36	to make a county fair exhibit
_____	20	38-40	to reinforce good e-use habits and reduce fossil fuel wastefulness

TYPE OF ACTIVITY	*SUGGESTIONS FOR FOLLOW-UP ACTIVITIES*
house inspection; demonstration of how to use thermometer	audio-visuals; posters showing wise e-use in the home for public display
word/spelling game	develop more games using energy words and ideas from Unit I
list of bulb wattages and number in home	judging lighting functions and most appropriate e-saving bulbs and tubes
month-long list; members compare lighting use	demonstrate types of lighting and proper usage; field trip to electric company or lighting store (introduce 4-H Electricity Project)
make posters for home; showering vs. bathing	members do own 2-day tub water measure of bathing vs. showering water (with ruler); comparisons; discuss lifestyles and choices
2 kitchen experiments (relate to 4-H Cooking Projects and "Building Family Strengths" Project)	corn-cooking session (using fresh, canned, frozen; various small cooking appliances for corn); car for shopping trips (discussion); show soda pop containers and energy use
fill-in blanks (answer: drop of water inside kernel + heat = steam for popping corn)	make salt and butter energy chains; make 3-D chains
2-D drawing or 3-D construction of family's e-chain; family discussion	display; fair booth; judging and comparing lifestyles
crafts construction	audio-visual instructions for Fossie; discuss and plan an energy-wise Achievement Day party with club families
4-H Easy e-Game introduce Unit II	members play game while leader checks members' books

The following pages present activities that correspond with Member's e-book, Unit I. You may be unable to complete all the objectives of the 1st meeting due to organizational delays. However, ideas herein are flexible and adaptable to other meetings.

1st Meeting: Refer to pages 3-7, *Member's Unit I*

OBJECTIVES: 1) to foster parental support; 2) to help members understand the e-Project; 3) to decide upon and assign activities

Invite parents with club members to the first meeting. Focus upon objectives of the e-Project. Regular meetings should be planned for demonstrating energy activities. Helpful parents can —

- assemble materials when the meeting is at their house; provide house and cooking thermometers, show members home furnace and water heater thermostats. One meeting of experiments requires a kitchen range.
- provide transportation for field trips and to go to the hardware store or lumberyard for Fossie the Draft-Detector's weather stripping and caulking supplies.
- carpool to and from meetings to save on fossil fuels!
- give guidance with activities, supervise home energy inspections and know types of faucets in the house.
- familiarize themselves with their children's club projects but not do the actual project work. Parents sign the bottom of each completed *Unit I* page.
- stimulate outside activities on energy.
- encourage participation in county and state activities.

Ask members what they would like to add to the Energy Project. The more they do, the more they will learn. By attending all meetings, reading their e-books ahead of time, bringing the required supplies and energy inventories to meetings, and evaluating their accomplishments, they will improve their skills and enjoy being in the club.

Parents will want to be helpful because energy is important to all of us. In the late 70's, Nebraska spent $1.6 billion on energy, or $1,100 per capita. Nebraska's goal is to realize an annual 10% savings of energy resources in the residential sector. Parents may wish to devise ways of measuring

energy consumption levels before and after the e-project to determine whether their households meet the 10% minimum. Even greater savings may be realized.

Planning Page

Encourage members to stick to goals and follow through by using and referring to the Planning Page in *Member's Unit I.* Assign "I plan to read and do" items, discuss due dates and have members fill in the page. Elicit follow-through by checking to see that their books are filled in at each meeting. Award each page with a Big e for finished work, or devise a special stamp of approval.

FORMS OF ENERGY page in *Member's Unit I* discusses the omnipresence of energy and its definition. There are 10 forms of energy underlined. The 11th—human energy—is precious, too. The fuel for human energy orginiates with plants, which convert solar energy partly into chemical energy. Thus, energy is transformed, or converted for human use. Lamps convert heat into light. Home furnaces convert energy from oil or gas molecules (potential chemical energy) into heat.

When members work with temperature and wattage in *UNIT I*, they will not be measuring energy per se. Temperature is a measurement of quality or intensity of heat; wattage is the rate of electrical flow or power. The fuel for energy can be measured by cost, which depends upon supply and demand. Food energy is measured by kilogram calories.

2nd Meeting: Refer to *Member's UNIT I*, pages 8-10.

OBJECTIVES: 1) to understand America's greatest indirect energy source, fossil fuels; 2) to discuss how they are used, why they are non-renewable.

Fossil Fuels

In the late 70's, fossil fuels accounted for approximately 97% of America's energy resources. They are indirect energy resources because they store the sun's direct chemical energy through decayed plant and animal matter. The chemical energy stored in fossil fuels is converted into heat and light for homes.

Three fossil fuels provide the U.S. with most energy needs: petroleum or crude oil, natural gas, and coal. Natural gas is the cleanest fuel to produce and use, while coal is not environmentally acceptable in many instances, although it is still plentiful. Many children today have never held a piece of coal.

Explain that in grandparents' time fuels were cheap and easy to get because they were near the Earth's surface. Now we need to dig deeper for them. An oil drill bit that reaches miles underground may cost over a million dollars. Research problems, expensive equipment, diminishing supplies, politics, delays, have all added to the cost of fuels. Their by-products cause undesirable pollution. Why should individual members want to use fuel carefully?

Someone may wish to interview a grandparent about the use of fuels, such as coal and wood, earlier in this century, and to give a demonstration comparing America's current reliance on fossil fuels. A list of appliances used now that were unavailable a few decades ago may be included. Show how lifestyles have changed.

Members may want to adopt today's ammonite, the chambered nautilus, as a club mascot. The nautilus still exists, having met challenges and changes on Earth. Its chambers are its home: neat, clean, efficient; it preserves its rooms, wastes nothing. Its spiral shape resembles an e, an energy symbol that would be fun for youngsters to draw, with watchful catlike eyes and tentacles like whiskers. Ours is nicknamed "Nautie," which conjurs up astronauts, cosmonauts, argonauts, as it moves about on jet streams of water. "NAUT" has a strong will to survive and meet challenges. Or, members may want to make their own *UNIT I* bookmarks out of a nautilus or e design.

THOUGHT: Can ammonite fossils be replaced? They existed long before dinosaurs. Nebraska Indian tribes have called these seashell creatures "ancestors of life, seeds of life within a shell." Members may wish to visit a museum with parents or the club to view these, or someone may have a collection to share, or want to make a research report about them.

Additional Meetings *(UNIT I, page 11)*

For 4-H members, saving fossil fuels can mean that by slowing down the use of their remaining supply, time will be gained to develop other energy sources that are renewable or unlimited. Thus, we will insure that there will always be energy to get things done, just as there is energy all around and within us! Help members to think of ways to keep fossil fuels from being used up rapidly in the home. The e-ideas for home heating, cooling, lighting and hot water are starters.

Inventory of Energy Resources *(UNIT I, page 12)*

NON-RENEWABLE FOSSIL FUELS	*RENEWABLE ENERGY RESOURCES*
crude oil (petroleum)	sun
natural gas	green plants
coal	wind
tar sands	waterfalls
oil shale	geothermal (Earth heat)
uranium	wood
	nuclear breeders
	human and animal muscles

For members whose households use propane gas, explain that it is derived from petroleum or natural gas.

The two biggest household energy users are the automobile, and home heating and cooling. By car pooling, combining short errands into one trip, avoiding fast starts, no Sunday driving, good maintenance, and keeping tire pressure at recommended levels, savings may be realized. Once a bicycle is manufactured (with the use of fossil fuels!) it uses few fossil fuels except lubrication oil occasionally. A bicycle care and safety manual is obtainable from your county Extension office. It offers a project that is compatible with the e-project.

THE HOME ENERGY CHECK *(UNIT I, page 14)* furthers the importance of reducing home heating and cooling costs. Check members' workbooks periodically to see that they are continuing with their intentions.

Draft Detecting and Fixing *(UNIT I, pages 15-19)*

OBJECTIVES: 1) to show ways that a family can save money on home heating and cooling; 2) to decide when, where and how to make Fossie the Draft-Detector

The efficiency of heating and cooling rises considerably with home improvements. Net savings (after materials costs) of $40 to over $100 can result when families:

turn thermostats 6^{o} F (3^{o} C) *lower* in the winter and the same degrees *higher* in summer,

put on plastic "storm windows" in basement windows, too

have the oil or gas furnace serviced every year.

Further net savings of several hundred dollars accrue by adding to the

above list the use of:

caulk and weather stripping,
attic insulation,
wall insulation above unheated spaces.

SAFETY NOTE: Caution members that an older person should stay with them when they look into basement, attic and crawl space areas.

INSULATION is a nonconducting covering that resists heat flow. It is of major importance in reducing energy waste.

When insulation is added to an older house (which is the process of *retrofitting),* caution must be taken to prevent moisture accumulation between walls. Wet insulation is useless. Therefore, outside-facing retrofitted walls of each room should be painted with two coats of an oil-based or enamel paint. The paint serves as a moisture barrier.

While younger club members may be unable to assist parents with insulating the home, caulking and weather stripping to fix noticeable drafts are within their capabilities. The small cost of materials may be offset by considerable savings in heating and cooling bills!

Members can give excellent demonstrations on dollhouses or small windows using the weather stripping and caulking supplies that they will actually use on their own homes.

Home Energy Inventory *(UNIT I,* pages 20-21)

A second house energy check reinforces thinking about saving fossil fuels. Use of a room thermometer and an understanding of the thermostat settings encourages members to make decisions about energy costs and personal thermal comfort.

page 22 - Answers to "SAVE FOSSIL FUELS" Word Game:

AIL	ELSE	FUSS	LILA
AISLE	EVE	ILL	LISA
ALAS	FALL	IS	LIVE
ALE	FILL	ISLE	LOLA
ALIVE	FIVE	ISSUE	LOSE
ALL	FLEA	LASS	LOSS
ALSO	FLIES	LASSIE	LOUIS
AS	FLOSS	LEAF	LOUISE
EASE	FLUE	LEAVES	LOUSE
EASEL	FOIL	LESS	LOVE
EAVES	FOSSIE	LIE	OF
EEL	FOUL	LIFE	OFF
ELSA	FULL	LIFELESS	OIL

OLIVE	SEA	SLAVE	SUE
SAFE	SEAL	SOAL	SULFA
SAIL	SEE	SOFA	USE
SALE	SELF	SOIL	USELESS
SALVE	SELL	SOLE	VALISE
SASS	SIEVE	SOLVE	VALUE
SAVE	SILL	SOUL	VASE
			VESSEL

More Meeting Ideas

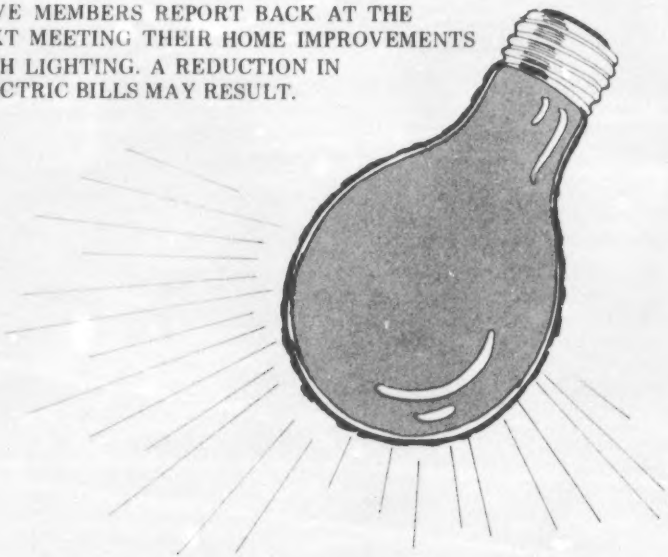
Energy for Lighting *(UNIT I, pages 22-24)*

OBJECTIVES: 1) to learn to make inventories of electrical usage in the home; 2) to compare varying family lifestyles through lighting use; 3) to help members realize that even small light bulbs add up to many kilowatt hours in a year.

In one hour, one 100-watt incandescent bulb may use energy that equals a half-cup of oil! Electric energy is measured by the kilowatt hour (1000 watts per hour, or kWh), a unit of electrical energy equal to the energy delivered by flow of electricity (a barrel of oil contains about 500 kWh of energy).

Reading kilowatt hours on an electric meter shows people how much electric energy is being used for the lights and appliances in their homes. How to read an electric meter will be shown in Unit II.

HAVE MEMBERS REPORT BACK AT THE NEXT MEETING THEIR HOME IMPROVEMENTS WITH LIGHTING. A REDUCTION IN ELECTRIC BILLS MAY RESULT.



At the lighting meeting, use a blackboard or a large piece of paper to write down members' comparisons of light bulbs in their homes. Differing lifestyles may emerge. Judging which home is most efficiently lit may be discussed. Areas of the home, such as hallways, may reduce energy waste by using bulbs of lower wattage. A member may want to show how a solid-state dimmer switch saves energy.

> AN e-IDEA is intended to make it a good habit of turning off lights. This could lead to a lifetime of kWh savings. Stimulate discussion of changing light bulbs to lower wattages or to flourescent tubes.
>
> Sometimes electric companies provide free stickers for light switches to remind household members to turn off lights.

Gas Meetings *(UNIT I,* pages 25-29)

OBJECTIVES: 1) to learn how natural gas (and L.P. gas) is wasted; 2) to do something about it at home

Fun experiments with gas include measuring shower and bath hot water and cooking to reduce energy waste. If time permits, a field trip to a plumbing supply store for faucet spare parts and faucet washers and a demonstration of faucet-fixing may be done.

NOTE: An efficient gas appliance will burn with a blue gas flame rather than a red or yellow one.

CORN COOKING leads to energy choices. Frozen or canned corn requires considerably more energy than fresh to produce and store.

Efficient agricultural production provides Americans with all of the corn that is needed. In 1910, a Nebraska farmer had to work 135 hours to produce 100 bushels of corn. For the same production in 1960, he worked 23 hours, and by 1973, only 4 hours! Farm machines save human labor and time and increase production. Industry uses only 1/10th of the corn kernels harvested to make many items. People, along with cows, chickens, hogs and pets, consume the remainder as feed grain. Most cornstalks are returned to the soil; some are used for silage and roughage.

POPCORN'S ENERGY CHAIN, page 31, is a prelude to the family e-chain, page 32. Members will ask: "What causes a popcorn seed to pop?" Water + heat = steam, which causes expansion of the soft cellulose material in the corn kernel. Ask members: Did you see by electric lights when you popped the corn? Was the TV on when you ate it? Perhaps a member would like to explore a salt or butter energy chain!

FAMILY e-CHAIN, page 32, should reflect each member's particular lifestyle. A Ford Foundation study reveals that as income increases, so does energy consumption. Upper income families consume a little more natural gas and electricity, and much more gasoline than do lower income people. Upper income homes are usually better insulated; however, use of the auto may increase as much as fivefold.

Fossie the Draft-Detector *(UNIT I,* pages 33-36)

FOSSIE'S PURPOSES: 1) to test for air leaks with the plastic bag on the tail, which moves with air currents (drafts); 2) to carry draft fixing supplies; 3) to serve as a county fair exhibit/entry**

Members may wish to spend a meeting making their own versions of Fossie the Dinosaur Draft-Detector. They may add their own ideas, such as a basket around Fossie's neck to hold tacks for weather stripping, or a plastic window sheet tied beneath Fossie's tummy.

SAFETY TIP: Do not place Fossie near a fan, flame source, nor between doors or on the floor where people might trip on it.

ADDED IDEA: A field trip to a hardware store or lumberyard may provide some weather stripping and caulking supplies and information about using them.

***JUDGING TIPS* - Encourage members to judge and compare their Fossies on the basis of the following criteria:

1. *Design* - is it simple, interesting? Does it stand? Is the tail tightly rolled so that rolls of caulk and weather stripping stay on?
2. *Size* - about 4 inches high x 15 inches long (10 cm x 38 cm). Are legs sturdy, at least thumb-thickness? Is tail about half of the total length of the dinosaur?
3. *Supplies* - Are they secure on the tail? Are both weather stripping and caulk used? Are good quality and useful supplies used? Is file card of instructions clearly written and securely tied around Fossie's neck?
4. *Workmanship* - is Fossie neat in appearance and attractive? Are legs connected securely to body?

Bonus Activity

SUN SPINNERS AND WHIRLERS

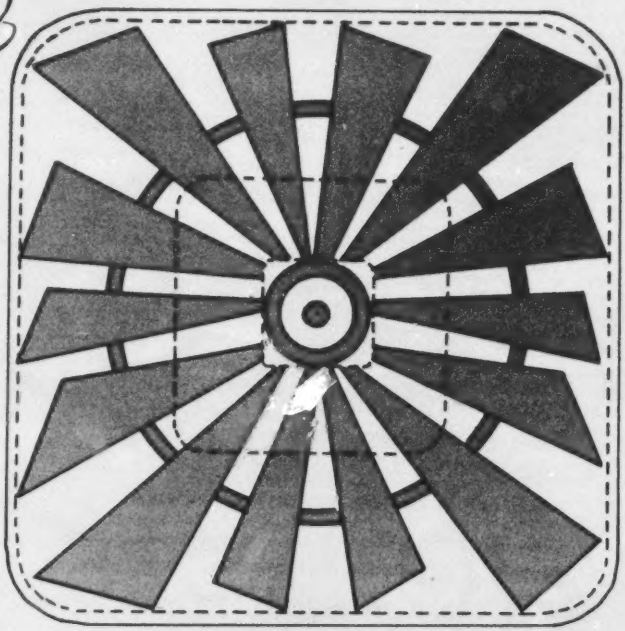
A game for energetic youngsters that is played like frisbee, these can be used indoors as well as outside. They have the advantage of protecting fingers from sprains. Members can form a circle and toss several at once. The sun and windmill decorations will encourage further enjoyment of the e project!

The designs shown can be enlarged. You can use freehand crayon or brush designs, or trace the patterns onto waxed stencil paper or cardboard, cut out, and brush in the colors through the stencil holes.

Try your own designs - become a wind or solar collector yourself!

The larger you make them, the more group fun. When large ones are not in play, use them as cushions! Someone who likes to sew and do crafts can make them with a minimum of effort.

(Full-sized patterns of the Sun and a Naut design may be available from your county Extension office. Full-size patterns of the Windmill design are not available.)



SIZE: 6 inches (15 cm) square with rounded edges; ¾ inch (2 cm) thick.

Materials:

1/2 yard (46 cm) plain woven fabric, white (or any warm color for sun, cool for wind)
sewing thread and needle, or sewing machine
stuffing material: polyurethane foam sheets or polyester fiberfill
fabric crayons or paints
iron

METHOD: Trace pattern on folded cloth. Cut out. Sew around edges, using a 1/2 inch (1 cm) seam and leave an opening for turning and stuffing. Clip curves. Turn and press.

Decorate both sides with your own freehand sun or wind motif. Iron colors to set them.

Stuff. Outline center with stitching through all thicknesses. Then stitch around middle section, smoothing out the three thicknesses. Finally, sew the outer edge opening closed.

Final Meetings *(UNIT I,* pages 38-41)

OBJECTIVES: 1) to finish activities in the e-Project; 2) to use the 4-H Easy e-Game to apply energy-use rewards and energy-wastefulness penalties.

The 4-H Easy e-Game can be played to reinforce ideas learned in *UNIT I.* Members should read and discuss each energy concept, instead of rushing to win. It takes less time to play when the club forms smaller groups. A penny per member is used as a game board marker and to emphasize e-savings!

ANSWERS TO THE WORD GAME, *UNIT I,* page 6

1. g
2. j
3. a
4. k
5. i
6. d
7. l
8. c
9. e
10. f
11. h
12. b
13. m

A LEADER'S STAMP OF APPROVAL

For each well done Workbook page, members deserve an e for effort.

1. Recycle an old rectangular eraser, such as pink pearl, by sanding one side smooth.
2. Trace a backward e on a piece of paper, and place it over eraser. Cut through paper with a hobby knife, outlining the backward e onto the eraser.
3. Carefully cut away excess eraser around the e outline.
4. Apply a water-based marking pen in brown or black to the backward e each time it is stamped.

REMIND MEMBERS THAT WHEN THEY HAVE MASTERED *UNIT I,* THEY WILL BE REWARDED WITH THE EXCITING SUN, WIND, AND OTHER ALTERNATIVE ENERGY ACTIVITIES IN *UNITS II* and *III.*

Use of Units II and III

Responsibilities of the e-Project Leader

* Help members choose activities from *UNITS II* and *III.*
* Relate club activities with the nation's energy needs.
* Develop a sensitivity to the needs of individuals in the club. Become

20

aware of varying lifestyles. Help them learn to make energy decisions daily.

* Attend leader training meetings for information, stimulation, and support.

* Inform parents of e-project objectives. Encourage them to participate in planning and follow-through.

* Think through meetings with safety in mind.

* Refrain from imposing personal values on others.

* Help each members choose a project that is appropriate to abilities and interests. Later, help each to evaluate accomplishments.

* Encourage participation in exhibits and demonstrations at fairs as a means of building skills and self-confidence.

* Help organize community-related e-activities.

* Grow with members, building upon your own background in energy conservation.

Unit II - Further e-Lists

Intermediate level members may wish to select an energy resource or area of residential, commercial or transportation to study. From this research, lists of e-savings ideas may emerge! To make list-keeping fun, have members decide upon using long rolls of paper - such as small tabulator paper or a large butcher paper roll, or even recycled and glued brown paper bags! An energy scroll or scrapbook may emerge. Artwork, magazine cutouts, and photographs would enhance these lists.

Upcoming Activities in Units II and III

To insure continuity for members in 4-H, leaders should tell members about the activities that await them in *UNITS II* and *III*, after they have completed *UNIT I*.

These activities include:

The Big e Contract

Understanding America's Fossil Fuel Needs

International Trade-Offs

The Big e Puzzle

Home Energy Inventories

Alternative Energy Resources

Transportation Needs

Recycling Fun

Energy Experiments

Building Sun and Wind Devices

Energy-related Careers

An Energy Play

Demonstrations Galore!

Hints for Successful Club Meetings

Always begin a project with parents attending the first meeting. Their support is important to the members and to you. They can help with decisions, such as:

* how often meetings are needed
* where meetings will take place
* time of meetings
* carpooling arrangements
* materials and items to have ready before each meeting (all members may not necessarily choose the same items to make)
* what can be done to help others
* how much work should be done at home before each meeting

To maintain interest, club meetings should include a variety of activities, such as:

1. *WORK MEETINGS*

Junior leaders and members can help with demonstrating each step to participants. Written instructions need explaining. Samples help clarify suggestions.

Group work sessions during meetings provide supervision right when it is needed, and encourage friendships, and incentives to complete projects. Group solidarity is attained through enjoyment and pride in accomplishment.

2. *DEMONSTRATIONS*

Each member should give a demonstration to fellow club members at least once a year. Demonstration ideas agreed upon well ahead of time might include:

Renewable Energy Resources
Meet Your Electric Meter
Forms of Energy in the Food Cycle
How to Fix a Leaky Hot Water Faucet
What Makes Insulation Work?
How to Detect Invisible Drafts
How to Seal Away Drafts

3. *FIELD TRIPS*

Tours that teach and relate to the e-project stimulate interest, reinforce concepts and develop skills. A utility company may pinpoint local needs and the efforts necessary to maintain a high standard of living. A company representative could show how to read a meter and monitor appliances. Seek home economics specialists who demonstrate low energy methods of cooking and daily living. A local food service business may eagerly show energy measures to young patrons! Someone at a lumberyard may explain different insulating materials. A local plumber or furnace supplier may have new energy saving devices. A library trip to search for "Energy" in the *Readers Guide to Periodical Literature* would keep members informed of current topics for outside reading, exhibits and news writing.

Youngsters may be welcomed at a university laboratory working on lasers, atomic energy, etc. Opportunities to visit solar houses are provided by power companies, local realtors or solar energy groups. Is there an operating windmill nearby to visit? Local lighting stores may carry new lamps and gadgets that control wattage.

All around you are resource people who are concerned about energy and who may be happy to open doors to your club.

After a field trip, be sure that each member expresses appreciation to the host in a thank-you note.

4. *EXHIBITS AND FAIRS*

Youth need recognition and appreciation. Communicating their accomplishments through visual and verbal means at fair time has become a tradition. Practice should come first at club meetings. On Achievement Day, members may invite parents and serve refreshments. This is an ideal time for members to view their own accomplishments and evaluate them privately. Demonstrating their projects to parents will help them to gain poise, self-confidence, and inspiration.

5. *EVALUATIONS AND JUDGING*

Demonstrations and finished work should be followed by evaluation and judging experiences. This not only reinforces learning, but raises the quality of workmanship and stimulates leadership.

Begin meetings by discussing the e -project, its objectives (one or two concepts to be learned) and activities that teach these concepts. After each lesson, evaluate work by recalling objectives and examining accomplishments.

While explaining directions, you may find that members will prefer to evaluate the prepared samples done by an adult or junior leader than to openly judge each others' work. Help members to look for good and bad features of a sample and ways to improve their skills. Question how they may transfer their observations to their own work.

Further ideas for judging experiences might include:

* Photos of energy efficiency vs. wastefulness in the home.
* Magazine cutouts of appliances glued onto a chart in a hierarchy of energy-eating BTUs. Judge which appliances might remain unplugged.
* A list of standards of an energy saving household.
* Deciding how far to go with the "less is more" concept in relation to our standard of living.
* Making decisions for a low energy pizza party using the least amount of energy (avoid using petroleum-based plastic, or non-returnable items).

Understanding 4-H Members

As a 4-H leader you will be guiding youngsters. They truly will benefit from what you share with them about energy. The way that you share this information is important. You will enjoy each meeting and activity when you are prepared and when you strive to help each individual. Preparation includes reading through this guide for energy facts and activities, and recognizing the learning needs of individual members. While it is up to you to appreciate each person's uniqueness, here are some "typical" stages of development:

AGES 9-11 (grades 4-6). Attention spans are short. Focus their attention on enjoyable activities to "turn them on." The chance to make something to exhibit or earn a prize, stimulates learning. Curious youngsters will learn skills just for fun. Even so, many are not quite ready for in-depth learning and perfection. Finger muscles and coordination may not be fully developed. Therefore, tedious or overly-detailed jobs are beyond their grasp. Bigger action counts.

You may need to repeat directions several times. However, you can vary these directions. Step-by-step suggestions, demonstrations, visual and touchable aids have proven successful. Written directions should be given in large print.

Acceptance by the group is vital. Allow group activities to take precedence over individual ones. Your patience, tolerance, and never-critical attitude will provide support.

This age group may lean on you for organizing and carrying out plans. You will find it easier to establish and repeat a time schedule with goals. This should eliminate dawdling and last minute blitz efforts to finish a project. Success comes with limiting goals to one or two at a time.

AGES 12-14 (grades 7-9). Intermediate age groups still depend upon the leaders for guidance. However, they are striving for independence and reject domination. Therefore, leaders should offer suggestions, often phrasing these as questions: "How about trying retrofittings?", "Do you think this deadline will work?", "Let's begin here, shall we?"

It sometimes is difficult for young people to admit that they do not understand something, and they may mask it behind know-it-all behavior. You can help by discussing plans within their abilities, then by asking "How-Who-Which-When-What-Why-Where" these plans will be carried out. Individuals will accept suggestions according to their own self-image and levels of maturity.

Keeping them interested longer in a project becomes easier. Repetition

aids learning and memory. Training and experience lengthens interest. Explain the reason for a skill to be learned. As a leader you can look for reasonable decision-making and follow-through on projects. Rotate youth leadership. Remind each of goals. Help each realize that skills will develop through training, repetition, production and experience.

Youth of this age often feel awkward due to uneven bone and muscle growth. Trying to understand and accept one's changing body sometimes undermines self-image and personal security. Therefore, appearance and grooming are important. Juveniles try to act and dress like the group. How the group accepts each individual is crucial.

Regardless of age, each young person needs approval from the group, family, and you, and the chance to work within one's own speed and abilities.

Energy-Related Careers

While there is no energy occupation per se, almost every career involves energy in some way — from its wise use to the development of new sources. Members should be made aware that many careers will affect, and be affected by, energy.

ACCOUNTING (includes bookkeeping)
ACTUARIAL SCIENCES
AGRIBUSINESS
AGRICULTURAL ENGINEERING
AERONAUTICS (aircraft, airlines, engineering)
ARCHITECTURE
ASTRONOMY (including solar research)
AUTOMOBILE DESIGN (engineering, production)
BIOLOGY (agronomy, biochemistry, microbiology, biophysics)
BUSINESS ADMINISTRATION
CONSTRUCTION (buildings, bridges, roofing, highways, civil engineering)
COMPUTER TECHNOLOGY
DIPLOMACY (foreign service)
ELECTRICAL INDUSTRY (including lighting engineering)
ENERGY LAW
ENGINEERING (research and development; atomic, chemical, electrical, metallurgy, mining, petroleum, coal gasification, gasohol, sanitation)
FOOD SERVICE INDUSTRY (chef, cook, etc.)
FORESTRY (lumbering, etc.)
GEOLOGY (geophysics)
HARDWARE INDUSTRY
HISTORIC PRESERVATION
HOME ECONOMICS (clothing, fashion, food and nutrition, consumerism, merchandising, family development, housing, interior design)
INDUSTRIAL DESIGN
JOURNALISM (including broadcasting, photography, printing)

LIVESTOCK MANAGEMENT
MATHEMATICS
MEDICAL TECHNOLOGY (including occupational therapy)
METEOROLOGY (weather, atmospheric and space research)
OCEANOGRAPHY
PHYSICS (laser technology, nuclear fission and fusion, etc.)
PLUMBING AND PIPE FITTING
POLITICS
PUBLIC RELATIONS
REAL ESTATE
REFRIGERATION AND AIR CONDITIONING (mechanics, research and design
SELLING (manufacturer's representative, wholesale, retail)
SOCIOLOGY (including social work)
SOIL CONSERVATION
SPORTS AND RECREATION (more use of human energy!)
STATIONARY ENGINEERING (power and heat equipment operation)
STATISTICS (mathematics, for government and business)
TEACHING
TEXTILE INDUSTRY
TOOL AND DIE INDUSTRY
TRANSPORTATION
VETERINARY SCIENCE

Publications to Read for Discussion, Debate, Demonstrations and Self-Development

"Alternative Energy," No. 24 (includes poster), and "Solar Heater," No. 21; *Mother Earth News*, P. O. Box 70, Hendersonville, N.C. 28739.

"Alternative Sources of Energy: Equipment Directory" - 4 issues; Route 4, Box 90, Golden, CO 80401.

Architecture and Energy, Richard G. Stein, New York: Doubleday Anchor paperback, 1978.

"Can We Harness Pollution-Free Electric Power from Windmills?", *Popular Science*, Nov. 1977, pp. 70-72.

"Citizen Action Guide to Energy Conservation," Citizen's Advisory Committee on Environmental Quality, Stock No. 4000-0300, from Supt. of Documents, Government Printing Office, Washington, D.C. 20402.

"Coal-Energy Bridge to the Future," Exxon Corporation, 1251 Avenue of the Americas, New York, N.Y. 10020.

"Coping with the Energy Crisis," Consumer Federation of America, Suite 901, 1012 12th Street, NW, Washington, D.C. 20005.

"Cyclogiro Windmill," *Popular Science*, Dec. 1975, p. 10.

27

"Energy and Ecology," Public Education Association, 20 West 40th Street, New York, N.Y. 10018.

"Energy, A Special 8-Page Report," National Wildlife Federation, 1412 16th Street, NW, Washington, D.C. 20036.

"Energy Options R & D Booklet," Edison Electric Institute, P. O. Box 2491, General Post Office, New York, N.Y. 10001.

"4-H Bicycle Safety," EC 7-31-77, Cooperative Extension Service, Lancaster County Extension Office, 5608 S. 48th, Lincoln, NE 68516, and from other Nebraska 4-H and county Extension offices.

"Food and Energy," and "Lifestyle Index," Center for Science in the Public Interest, 1779 Church St., NW, Washington, D.C. 20036.

"Gasoline: More Miles Per Gallon," Stock No. 5000-00072, U.S. Government Printing Office, Washington, D.C. 20402.

"Pedal Power; Courses for Action for Commuter Bike Routes," Bicycle Institute of America, 122 East 42nd Street, New York, N.Y. 10017.

"The Contrasumers," Albert J. Fritsch, 1974, Praeger Paperbacks.

"Science Activities in Energy" booklets, U.S. Department of Energy, Technical Information Center, P. O. Box 62, Oak Ridge, TN 37830.

"Solar Power and Wind Generators for Old Buildings," *Engineering Digest*, August 6, 1976, page 51.

"Stop the Draft," Bldg. 90, Rm. 3078, Lawrence Berkeley Laboratory, Univ. of California, Berkeley, CA, 94720.

"Tips for Energy Savers," and "Tips for the Motorist: 30 Good Ways to Make Gas Go Further," DOE, Technical Info. Center, P. O. Box 62, Oak Ridge, TN 37830.

"Wind Generators," *Architectural Design*, March, 1974, page 189, 7/8 Holland St., London W8, England.

"Windmills and Watermills," J. Reynolds, 1974. New York; Praeger Paperbacks.

"Wind-Powered Homestead," No. 18, page 25, *Mother Earth News*, P. O. Box 70, Hendersonville, N.C. 28739.

Send Your Questions to:

e-information
State 4-H Cooperative
Extension Service
Ag. Hall 116
Univ. of Nebraska
Lincoln, NE 68583

Nebraska Energy Office
301 Centennial Mall South
P. O. Box 95085
Lincoln, NE 68508
(402) 471-2867

GROUPS THAT HAVE HELPED US:

Office of Conservation Education
Federal Energy Adm.
Washington, D. C. 20461

American Conservation Assn., Inc.
30 Rockefeller Plaza
New York, N.Y. 10020

Center for Science in the Public Interest
1779 Church Street, NW
Washington, D. C. 20036

Thomas Alva Edison Foundation
Cambridge Office Plaza
Suite 143
18280 West Ten Mile Plaza
Southfield, MI 48705

U. S. Dept. of Energy
Technical Info. Center
P. O. Box 62
Oak Ridge, TN 37830

American Assn. for the
Advancement of Science
1515 Massachusetts Ave., NW
Washington, D. C. 20005

American Petroleum Institute
1801 K Street, NW
Washington, D. C. 20006

Dean's Office
College of Engineering and Technology
University of Nebraska
Lincoln, NE 68508

Environmental Protection Agency
Public Information Center
(PM 215)
Room 2106
Washington, D. C. 20460

The Conservation Foundation
1717 Massachusetts Ave., NW
Washington, D. C. 20036

Lawrence Berkeley Laboratory
University of California
Berkeley, CA 94720

Sources from Your NEO*

The following materials are available from your
*Nebraska Energy Office
P. O. Box 95085
Lincoln, NE 68508
(402) 471-2867

Science Activities in Energy (set of 4, grades 4-6)

Your Energy World (set of 4, grades 4-6)

Nebraska Energy Conservation Plan

How to Save Money By Insulating Your Home

Home Energy Savers' Workbook

65 Ways to Save Natural Gas

How to Understand Your Utility Bill

Energy Savings through Thermostat Controls

LES: Solar-Assisted Heat Pump Heating and Cooling System

Solar Energy and Your Home

The Nebraska State Solar Office

Nature's Invisible Rays

Ocean Thermal Energy Conversion

Fuels from Biomass

Waste Heat Recovery: More Power from Fuels

Large-Scale Storage of Electricity in Batteries

Energy in Focus - Basic Data

The Gasoline Mileage Book

Turning Down Auto Air Pollution

Driving Alone Costs You More Than You Think

Plan Ahead (car/van pool)

When the Circuit Breaks (film) by Fed. Energy Adm. (25 min.)

Saving Home Energy (film) by Nebraska Energy Office (22 min.)

All About Insulation (film) by Owens-Corning (15 min.)

Running on Empty (film) by DOE, Washington, D. C. (27 min.)